

Peer to Peer Librarianship: Mirroring the Network

by

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“...the only way of discovering limits of the possible is to venture
a little way past them into the impossible.”

Arthur C. Clarke¹

Seldom does the real future coincide with human forecast. In this age of the millennium change it behooves all institutions nurtured by the technology of the printing press to challenge their every assumption in order to make productive next step changes.

Arthur C. Clarke goes on to admonish that there are well-illustrated incidents of man's “failure of nerve” and “failure of imagination”² when assessing the impact or acceptability of new technology. Clarke discusses how basic scientific facts have been overlooked many times by otherwise knowledgeable experts when evaluating the future potential of flight. In the communication technology field, it was initially thought that the telephone would and should make travel unnecessary.³ Instead later researched suggested that, “people...develop relationships by communicating, which lead them in turn to travel so as to come together.”⁴ In addition, the ability to communicate over distance in real-time brought about better coordination to accomplish work and to share.⁵

We cannot really know what our future will bring. We do know that the agent of change is the network: a result, perhaps unintended, of inventing the computer. The digital network links personal computers and creates a killer communication conduit for the whole world. All new mechanisms for human contact ultimately drive huge societal changes. The printing press made it possible for an individual author's works to be quickly and reliably copied for distribution. This technology was the foundation for new businesses that allowed authors to reach untold strangers over great distances and over time. It changed the world. It is critical to comprehend that the network is more than a means of distributing objects such as printed text or audio files. It is about sharing and it is about wide, fast, immediate distribution. It is fundamentally about human-to-human communication.

¹ Clarke makes this statement in his work Arthur C Clarke, *Profiles of the Future* (New York: Harper & Row, 1973). In the 1973 edition on page 21, he comments that the French edition referred to this as his Second Law. The book was originally published in 1958.

² Ibid. The first two chapters have these titles respectively.

³ Ithiel de Sola Pool, *Technologies without Boundaries* (Boston, MA: Harvard University Press, 1990).p. 224.

⁴ Ibid. p. 16

⁵ Ibid. p. 225

Ithiel de Sola Pool, the late MIT Professor, warned that “If information services, text, mail, and conversations increasingly use the same electronic network, then, conclusions reached by looking at elasticity of demand for any one service may be misleading.”⁶ Instead one must recognize that different models are in the process of evolving and that the use or demand will create markets whose behavior cannot reliably be foreseen.

One model that is emerging on the global network is peer-to-peer connection and accomplishment of work. While the traditional web, and isn't it astounding that after less than a decade one can describe the web as traditional, has primarily mimicked the traditional broadcast media by communicating in a one to many paradigm, peer-to-peer takes the power of the network to another level enabling many to many processes. It is this next step that must govern our awareness in all aspects of our work. Otherwise, we as individuals and as institutions will not make the transitions needed.

The network fundamentally alters our cultural constructs, such as our method of carrying out our daily business and how we place value. The current developments of moving the distribution of texts to the network is really little more than re-arranging the deck chairs on a sinking ship.⁷ Which isn't to say that we shouldn't be doing it. What is important is the realization that this conversion is not a fundamental change, it is a merely a step toward what is coming. We must recognize that the work has to and will fundamentally change.

We can find hints of how our lives will change with the network. Models of human activity based on collaboration and sharing exist. It is not surprising that the inventor of the Web, Tim Berners-Lee, was an active physicist. In research it is necessary to “merge thinking” to make discoveries. This “merged thinking” needs to occur unhindered over time and geographic limitations. In his book, “Weaving the Web,” Chapter 12 is entitled “Mind to Mind:” the notion of people quickly solving problems by working together online. He says, “In 1989 the driving force I had in mind was communication through shared knowledge, and the driving “market” for it was collaboration among people at work and at home. A group of people of whatever size could express themselves... quickly acquire and convey knowledge, overcome misunderstandings, and reduce duplication of effort.”⁸ He even hypothesized, “Perhaps the Web will enable more organic styles of management ... People make commitments and negotiate them in groups, without having to go to a manager.”⁹

The global network will encourage humans to flatten hierarchies to accomplish work. This is also a hallmark of the print age and is largely related to the fixedness of the end product. The printed page, journal, book, as objects, could only have one process at a time acted upon it. Thus the creation process was linear and hierarchical so that work could be organized to reliably produce the printed page. In libraries, again, the process of

⁶ Ibid. p. 228

⁷ John Perry Barlow, “The Economy of Ideas,” *Wired* 2 (1994).

⁸ Tim Berners-Lee, *Weaving the Web : The Original Design and Ultimate Destiny of the World Wide Web by Its Inventor* (San Francisco: Harper, 1999). p. 162

⁹ Ibid. p. 174

selection and handling is hierarchical. The cultural goals of preserving books as knowledge were also tailored to this fundamental characteristic.

Now, we have a radically different technology that defies the intrinsic sameness of print. In fact, users of the network demand change and constant updating; they want to know what is new. Simply put, the incredibly wide distribution and visibility of actions on the network provide a societal feedback mechanism never before experienced. This characteristic is bound to create new models for such concepts as authentication and archiving, just as when the printing press eliminated handwriting analysis and substituted business relationships as the new model for establishing authentication. It is inevitable that human society will devise a new model for the networked world.

Academic libraries have traditionally marched to their own drummer. Their charge originated in a larger institutional context, but it was left up to librarians with expertise in the practice of acquiring, organizing and preserving information materials to determine how that mandate would be carried out. Just as books were meticulously organized following strict guidelines, so the library management arranged itself into a rigid, vertical hierarchy; the larger the library, the less interaction occurred between functional areas. Everyone had their own assignment and a supervisor to oversee their work. This command-and-control management style, while not necessarily conducive to congeniality, nevertheless worked. The top library managers had all undergone the same preparation; there were relatively few variables to consider and minimal time constraints.

Narrow spans of individual expertise and accountability did not encourage collaboration, nor was innovation and creativity fostered in a context of highly specified rules and procedures. Top-down management naturally discouraged the development of problem-solving or decision-making skills. And since everyone with the MLS had been taught the same rules, librarians themselves shared fundamentally identical points-of-view. Savage presents a model that clearly illustrates this arrangement. He describes it as...“the simple calculus of importance: the higher up a person is, the more important that person appears to be.” Savage suggests that one’s position determines not only what one may do, but also the value of one’s effort, noting “the irony of this model is that those who add value to the product [cf. shelvees, document copy makers, pages, etc.] are usually the least valued in the organization.”¹⁰ This model of academic library management still persists.

White states that the three chief characteristics of the Digital Age flourish only in a “high-trust culture.” First, the Shift to Knowledge Work involves...“harvesting intellectual assets and emphasizing innovation, and requires highly skilled workers who are respected, valued and empowered.” The second, Agility, involves the ability to...“learn to fail fast; fix the problem, not the blame.” And lastly, Strategic Innovation through a...“process that is continuous, diverse and democratic...the best ideas usually come from the bottom, not the top!” White concludes, however, that without an

¹⁰ Charles M Savage, *Fifth Generation Management*, Revised ed. (Boston, MA: Butterworth-Heinemann, 1996). p. 99.

underlying sense of trust...“individuals will not take the risks that are necessary for innovation.”¹¹

Since the Internet represents a medium where connectivity is continuous across and throughout the organization, the command-and-control management style of the Industrial Age must give way to leaders who are “adept at making decision-makers, not making decisions,” says Stephen Yearout.¹² Doing business at “e-speed” requires leaders at all levels because...“you can’t have a large leadership pool unless you have trust in your people.” There is no time to prepare problem reports or hold committee meetings. For this reason, an organization must configure its management model to reinforce the unique characteristics of the Internet. Kanter relates success as a global player to essential leadership qualities that she defines as...“the imagination to innovate; the professionalism to perform; and the openness to collaborate...In a high-tech world, organizations need to be more fluid, inclusive and responsive.”¹³ Hesselbein characterizes this as “collaborative courage.”¹⁴

Within the library, real-time innovation demands a high degree of flexibility, intuition, and creativity among individuals and groups. Ongoing input from people throughout the organization enriches the quality of library outputs and streamlines response time; inclusive decision-making also assures buy-in. In a networked world, the hierarchical, command-and-control management model of the Industrial Age is no longer effective. Too many people have vital expertise and too little time is available to orchestrate how they will contribute what they know. Kedia and Mukherji observe ...“a major shift ...from vertical values, such as individualism and autonomy, to horizontal values, such as interdependence and networking.”¹⁵ In other words, “the old hierarchy is dead. We must build flexible, fluid, circular management structures with high involvement and inclusion of all – structures that permit us to lead people and not to contain them.”¹⁶

As many managers learned during the rush to create organizational change in the 1980’s, meaningful change is not implemented at the top but is created within, rising throughout the organization. “Change insurgency doesn’t depend upon formal rank; it depends on great ideas, powerful visions, and daring examples. There’s no way that the people at the top can know enough...to be the major instigators of change.”¹⁷ According to Stopford, innovation, creativity and ultimately change require “the strengths of a networked environment”¹⁸ “It’s often much more productive to let individuals and teams translate

¹¹ Scott White, "Competencies to Build for Success in the Digital Era," *IMR Global* Clearwater, Florida (no date). p. 4

¹² Yearout, Stephen, quoted in Sharon O'Shea, "The Changing Composition of Leadership," *Financial Executive* 16, no. 4 (2000). p. 1

¹³ Rosabeth Moss Kanter, "The Enduring Skills of Change Leaders," *Leader to Leader* 13 (1999). p. 3

¹⁴ Frances Hesselbein, "The Campaign for Leadership," *Leader to Leader* 17 (2000). p. 3

¹⁵ Ben L. Kedia, Ananda Mukherji, "Global Managers: Developing a Mindset for Global Competitiveness," *Journal of World Business* 23, no. 3 (1999). p. 238

¹⁶ Hesselbein, "The Campaign for Leadership," p. 2

¹⁷ Robert B Reich, "Your Job Is Change," *The American Prospect Online*, (2000).

¹⁸ John Stopford, "Should Strategy Makers Become Dream Weavers?," *Harvard Business Review* 79, no. 1 (2001).

the [vision] into a 'reach' target that they impose upon themselves. Andy Grove is right—[organizations] need to radically broaden their process for getting to the winning strategy.”¹⁹ “Likewise, techniques that facilitate change within organizations – creating listening posts, opening lines of communication, articulating a set of explicit, shared goals, building coalitions, acknowledging others – are keys to creating effective partnerships and sustaining high performance, not just to managing change.”²⁰

During her tenure as Executive Director of the Girl Scouts of the USA, Frances Hesselbein created a flat organizational structure in which...”people and functions moved across...concentric circles with the [director] in the middle looking across, not at the top looking down.”²¹ She dispersed leadership across the organization and encouraged “collaborative relationships, the wise use of teams, and mutual respect.”²² “Our people moved across the circles of the organization – never up and down – and the result was high performance and high morale.”²³

A peer-to-peer library management model integrates a broad range of relationships among staff members, with the parent institution, and across the world of local customers, suppliers, publishers, colleagues and competitors.²⁴ By emphasizing peer-to-peer relationships and encouraging staff to pursue initiatives, people may be encouraged to “reach out to one another to work on whole sets of challenges in teams and clusters of teams, in distributed environments across functional and organizational boundaries.”²⁵

Communication is central to the Internet; it is also central to establishing a library that shares information freely throughout the organization. Helgesen calls intra-organization linking the “Web of Inclusion.” “Open conversation throughout an entire organization...works because when people feel valued...they more easily value one another. This, in turn, increases trust and openness.”²⁶ In a networked library, trust among individuals and groups is mandatory for building “leadership all the way down the line.”²⁷ “Without a high trust culture, individuals will not take the risks that are necessary for innovation.”²⁸ Managers who understand that a library’s capacity to innovate is critical, and that innovation is the basis for creating value-add, will “display a bias toward action, risk taking, and curiosity.”²⁹

In a real-time, networked world, strategizing and innovating requires fluidity and a range of inputs. No long-term standing committee is likely to deliver solutions as quickly as an

¹⁹ Ibid.

²⁰ Kanter, "The Enduring Skills of Change Leaders,".

²¹ Frances Hesselbein, "Managing in a World That Is Round," *Leader to Leader* 2 (1996). p. 2

²² Frances Hesselbein, "A Star to Steer By," *Leader to Leader* 1 (1996). p. 3

²³ Hesselbein, "Managing in a World That Is Round,". p. 2

²⁴ L. Baird, "Meeting Global Challenges: The Executive Perspective, (Unpublished Working Paper)," *Journal of World Business* 34, no. 3 (1999). p. 245

²⁵ Savage, *Fifth Generation Management*. p. 99

²⁶ Sally Helgesen, *The Web of Inclusion: A New Architecture for Building Great Organizations* (New York: Doubleday Currency, 1995). In Savage, *Fifth Generation Management*. p. 140

²⁷ Bruce Pasternack quote in O'Shea, "The Changing Composition of Leadership,". p. 1

²⁸ White, "Competencies to Build for Success in the Digital Era,". p. 1

²⁹ Warren Bennis, "The Secrets of Great Groups," *Leader to Leader* 3 (1997). p. 5

ad-hoc task force, focused on a single, well-defined issue and more importantly, comprised of staff with specific [relevant] skills and insights to bring to the table. Although a library manager may serve as “angel” or consultant, the task-force is self-governing and makes periodic reports on progress towards completing their charge to managers or at general meetings.³⁰ Buck goes on to say that task force members, regardless of department or job grade, “learn to define the question, organize fact-finding, conduct interim management briefings and prepare a final report.”³¹

Task forces accomplish four major objectives for the networked library: They provide excellent opportunities for staff development, the building of a culture of self-teaching. They let staff see the extent to which their input is valued and implemented. They build staff trust and acceptance of strategy. And they develop leadership throughout the organization. “Collaboration and partnership can be a vehicle for new organizational learning, helping the organization to recognize dysfunctional routines and preventing strategic blind spots.”³²

Libraries’ long-standing prejudice against hiring professionals without the MLS must be abandoned; what worked in the print-only era, cannot meet the demands of the academic library that aspires excellence in the network age. “While we continue to value well-prepared MLS librarians, we must consider hiring specialists with purely technical backgrounds (software, systems, networks), business managers, and experts in licensing and contracts.”³³ Maintaining high standards for advanced information access and real-time service response allows no margin for making do or trying to locate someone who knows.

“Every [organization] constantly needs new ideas, new perspectives, new ways of thinking about its products, its services and its customers.”³⁴ The academic library with a global vision must be rigorous in the way it recruits and hires new people. Attracting “the right talent...means knowing what you need and being able to spot it in others. It also means understanding the chemistry of the group.”³⁵ A highly innovative peer-to-peer organization requires not only contributors and communicators, but also people who will “rock the boat.” A forward-looking library recognizes that to achieve diversity of viewpoints and insights, it must create a “flow of new people into [the group] to produce a creative tension between the old hands who know the ropes and the new hires who are there to disturb the status quo...and keep the organization vibrant, involved and alert.”³⁶

Discovering opportunities for value add is particularly challenging for academic libraries, constrained as they are by their own long-standing traditions and their customers’ often narrowly defined expectations. Even to this day, despite the growth in desktop access to

³⁰ Anne M. Buck, "Library Management 2000," *UK SLIS Newsletter* Spring 2000 (2000). p. 4-5

³¹ Ibid. p. 4

³² David J. Teece, Gary Pisano and Amy Shuen, "Dynamic Capabilities and Strategic Management," *Strategic Management Journal* 18, no. 7 (1997). p. 520

³³ Buck, "Library Management 2000," p. 5

³⁴ Reich, "Your Job Is Change," p. 3

³⁵ Bennis, "The Secrets of Great Groups," p. 4

³⁶ Reich, "Your Job Is Change," p. 3

digital resources and value-added user services, collection size persists as the leading indicator of library excellence. However, the Internet itself provides the means to challenge prevailing wisdom by going outside your industry and returning with fresh ideas. Kanter observes that network technology has presented innumerable businesses with opportunities to reconceptualize what they do.³⁷ On the threshold of the Information Age, libraries have the potential to establish an important niche in the digital mainstream by creating new, Web-relevant services based on emerging electronic and communication technologies.

Libraries began to confront “value-add” during the wave of corporate downsizing, reengineering, and restructuring in the turbulent 1980’s. As competition for budget dollars became fierce within organizations, libraries were forced to justify continued support. Although academic libraries endured far less turmoil, the escalation in journal costs depleted the budgets of traditional information programs. It has become important to determine which activities are most central to the library’s mission, most heavily used by customers, and most economical to maintain. Having gained insights from various studies including as cost/benefit analysis, libraries further discovered that adding value and containing cost could ameliorate the shrinking power of the budget.

For academic libraries, the Internet and networking technologies have appeared at a most opportune time. Web access is generally available on campuses, and librarians themselves demonstrate increasing digital literacy. Reference librarians in particular are well positioned to lead in the creation of value-added services for their user communities. Collaborating with customers who are likely to have access to the same sources, reference staffs add value by helping them navigate among options, verify findings, and customize the presentation of results. As the availability of information resources proliferates on the Web, the ownership of physical items is less important than expertise in selecting effective digital resources and integrating them onto the desktop. Furthermore, significant value-add may be realized when Web-delivered information resources are customized by way of innovative local applications. When the Internet is routinely scanned for ideas that have never been applied to libraries, the development of new services with significant value-add may begin. To paraphrase Tom Peters, good ideas exist to be copied.³⁸

The Internet empowers libraries to break out of their physical confines and extend their influence not only to the desktops of local users but also to those of remote colleagues and customers. Connolly notes that customer relationships are being transformed... “The Internet is promoting enormous communities of interest,”³⁹ he concludes. White adds that as connectivity spreads and crosses boundaries, value does not occur in a linear fashion, but becomes part of a “value web.” For example, the assistance the library provides one user may have the potential to become integrated into a far broader network contributing to the work of many.

³⁷ Kanter, "The Enduring Skills of Change Leaders," p. 5

³⁸ Tom Peters, *Thriving on Chaos* (New York: Knopf, 1987).

³⁹ John Connolly, "Revolutionary Wars," *Across the Board*, (2000). p. 43

The global library goes beyond the “digital library’s” focus on simply providing access to various electronic information resources. This “electronification” of print has been a useful first step; it provides libraries an excellent opportunity for developing comprehensive digital resource management skills and new models for user education. Simple observation of customer interaction with digital media has provided valuable insight into the ways people respond in the electronic environment. Such observation also contributes to a better understanding of how library users define value, and is essential before undertaking the development of “value add.” But now that... “the competition is...but a few clicks away,”⁴⁰ and libraries are no longer the only information game in town, it is time to consider the future and the next step towards globalization of libraries.

Libraries that maintain information-rich electronic portals are finding that “websites lend themselves marvelously to being both global and local at the same time.”⁴¹ By making a portion of this added value available over the Web, libraries share their expertise and build a worldwide reputation for excellence that benefits both themselves and their parent institution. McDonald⁴² concurs, “it has been global trade in ideas---knowledge---that has proven most valuable.” For the academic library, dedicated to providing timely, usable information, this is a dream scenario filled with opportunity.

Peer to peer describes communities of productivity. Research groups collaborate peer to peer, and will continue to do so. As this form of scholarly communication evolves through the intensive use of the network, different methods of sharing will be practiced. Currently, research groups work relatively privately until results have been described and then formally distributed through a research paper. It is the paper, perhaps preceded by a conference publication, that is the legacy form for communicating and recording results. However, the emergence of electronic preprint servers may be changing the course of scholarly publication, and in doing so may be opening up a significant arena for library participation as the decline in access to print resources accelerates.

The escalating cost of subscriptions to research journals and other barriers to access erected by entities that hold the copyrights to scholarly materials have encouraged some forward-looking library initiatives. For example, the response to the European Copyright Directive⁴³ and SPARC's "Create Change" web site⁴⁴ are making inroads in this area.

⁴⁰ George S. Yip, "Global Strategy in the Internet Era," *Business Strategy Review* 11, no. 4 (2000). p. 6

⁴¹ Since 1995, the Caltech Library System website has evolved into an electronic reference desk. Built and maintained by a rolling, semi-autonomous task-force comprised of CLS staff from various departments and of varying job titles and grades, the website is heavily used both at Caltech and beyond. For example, during the period March 1-31, 2001, the CLS website accumulated 150,607 accesses. Of these, 10,538 came from 362 different U.S. academic institutions, and 11,436 originated in 81 foreign countries representing six continents (see <http://library.caltech.edu/statistics/current/11017.htm>).

⁴² Peg McDonald, "Globalization - Business Opportunity and Km Challenge," *KM World* 10, no. 2 (2001). p. 12

⁴³ The original text of European Copyright Directive was sufficiently altered to maintain fair use of copyrighted materials. Otherwise payment to the publisher for every single copy made by a librarian or library user in paper or electronic format would have been required. Fred Friend, *European Copyright Directive* [Electronic Mail to The Consortium List <consort@ohiolink.ohiolink.edu>] (Thu, 15 Feb 15:00:49 2001 [cited 2001]).

Librarians are well aware that he who has the rights controls the access. Now, academic librarians may create value-add by collaborating with researchers to develop local systems for releasing scholarly works.

These avenues exist already in preprint servers and in locally produced electronic publications, and also allow authors to determine how copyright may apply. Similar opportunities exist in technical reports and conference papers. In the latter category, using E-Prints software, the Caltech Library System gained the non-exclusive permission to electronically mount, in perpetuity, the papers of a locally hosted mechanical engineering conference, Cavitation 2001. The conference convener readily accepted the library's expertise and embraced the library's digital collections approach in lieu of publishing a CD-ROM. These pdf papers on cavitation in the year 2001 may well become the focus of an evolving subject domain.

At present, libraries are debating whether the traditional philosophy of archiving will be extended to the digital environment. We naively aspire to save it all as it was digitally, reflecting our heritage of the printing press and more precisely the age of "typographical fixity." "This preserved accumulation over centuries is the foundation of our current concepts of thinking and knowledge. So, naturally, we believe that the models that have shaped our world and served us well for four hundred-plus years must continue."⁴⁵ However, the strength of the electronic medium is access not storage. In the print environment, storage came first. In the network environment this paradigm will be turned on its head. Access will be the priority and retention or preservation will derive as needed from the access environment.

The network environment demands ongoing change. Problem recognition, opportunity identification and solution implementation now fall on a continuum as customers await response in real-time, in order to be efficient, effective, and above all, competitive in this new environment. Conducting business in the Digital Age requires new skills and competencies from organizations as well as the people who comprise them; we must learn how to network with unseen colleagues and entities. To maximize the potential of the Internet, organizations are transforming the way they do business, incorporating characteristics inherent in networks. They are developing what Rhinesmith calls a "global mindset...the ability to scan...from a broad perspective, always looking for unexpected trends and opportunities."⁴⁶ This process requires that we redesign our strategies, reconceptualize our work structure, and revitalize our people. We must look for ways to go beyond the status quo, continually seeking new models and discarding those that are approaching irrelevance.

⁴⁴ Association of College and Research Libraries Association of Research Libraries, and SPARC, *Create Change: A Resource for Faculty and Librarian Action to Reclaim Scholarly Communication*. [Web] (2000 [cited April 29 2001]); available from <http://www.createchange.org/>.

⁴⁵ Kimberly Douglas, "Digital Archiving in the Context of Cultural Change," *Serials Review* 26, no. 3 (2000).

⁴⁶ S.H Rhinesmith, *A Manager's Guild to Globalization: Six Keys to Success in a Changing World* (New York: Irwin, 1993). Cited in Kedia, "Global Managers: Developing a Mindset for Global Competitiveness," p. 231

Libraries can no longer develop value-added access to global information resources in isolation. In the past, their physical collections made libraries relatively self-sufficient except for the inter-library loan activity and the occasional cooperative projects for sharing collections. Just as becoming a net-lender in the print world became too burdensome, developing net-access cannot be expected of any one organization. Now it is necessary to share more than collections; building the access-rich environment that knowledge seekers crave requires multi-institutional work effort and shared expertise. In cooperative and collaborative development, the value of the results may exceed the sum of the various parts: a result of positive network externalities.⁴⁷

The Internet defies national barriers; Australian, United Kingdom and Scandinavian countries collaborate with research universities across the United States. These initiatives in turn are likely to become reference points for libraries worldwide and may be introduced into local offerings for value-add at home. For example, when Ed Fox at Virginia Tech launched the National Digital Library of Theses and Dissertations (NDLTD), he empowered other universities worldwide to undertake electronic theses and dissertations initiatives of their own by providing support and access to a practical model. Those participating, in turn, are contributing their own expertise to the electronic theses effort and are sharing it with others. Another example is Networked Computer Science Technical Reference Library (NCSTRL). This project was hosted by Cornell University; the development work enabled computer science departments world-wide to place their technical reports on the Web. The Open Archives initiative (OAi) is another recent startup that illustrates the move toward multi-institutional collaborative work to re-engineer access to scholarly resources. And lastly, SFX, an innovative approach to citation resolution, is the result of Herbert Van de Sompel's work⁴⁸ at the University of Ghent in Belgium. In less than two years implementations around the world have begun to appear.

For years, academic libraries have been seeking ways to extend their influence over the development of information resources and to gain recognition for their contributions to higher education. Achieving these objectives has been slow and frustrating particularly since libraries continue to be defined in terms of their parent institutions. While participation in library consortia and professional associations continues to provide an important forum for sharing viewpoints and building collaboration, these organizations too are constrained by geography and the relatively specialized range of members' affiliations and backgrounds. The time has come for libraries to pursue an advanced networking strategy and open up channels for scanning the Web for opportunities.

As the dominance of print gives way to an expanding variety of digital formats and information media, the reputation of the 21st century academic library will be determined by the extent of its influence and not by the size of its physical holdings. Using the Internet both as an organizational model and as a vehicle for transforming itself from a local gatekeeper to a global enabler, the global library will be known by its vision,

⁴⁷ Network externalities is explained at length in Carl Shapiro, Hal R. Varian, *Information Rules : A Strategic Guide to the Network Economy* (Boston, MA: Harvard Business School Press, 1999). p. 183

⁴⁸ Von de Sompel published three papers in *D-LIB Magazine* in 1999 describing SFX.

leadership and innovation. It will use its worldwide connections to bring high-quality, imaginative, value-add to local customers, and it will share its growing expertise with colleagues across the Internet.

Ultimately, the networked library is likely to become a service that seems more ephemeral to librarians but may appear increasingly real to its users. Perhaps less a place than a point in time, the Information Age library will emerge as a switching center for access to ideas. One might speculate that the library may evolve into a facility for contemplation and that in the future, a text may no longer provide the basis for deep thinking. But somewhere in the background, real or virtual, the academic librarian will continue to do what librarians have done since the days of Hammurabi: serve the need to know.

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